OPTIMIZATION OF RANDOM RUBBLE MASONRY RETAINING WALL DESIGN

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Degree of Master of Engineering in Structural Engineering

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Dissertation submitted in partial fulfillment of the requirements for the degree
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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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Date: 8th of April 2015

A.N. Santhajeewa

The above candidate has carried out research for the Masters Dissertation under my supervision.

Date: 8th of April 2015

Dr. Mrs. D, Nanayakkara

ABSTRACT

The conventional earth retaining structures built using Random Rubble Masonry (RRM) are designed as gravity retaining structures where weight of the structure is used for its stability. In Sri Lanka, RRM retaining walls is the most common type of retaining structure for low retaining heights .However; in general, engineers are reluctant to adopt RRM for retaining heights more than 3m high, due to comparatively large sections obtained as the result of conventional design practice. More optimal and creative solutions could be obtained even for low retaining heights, if design material properties of RRM are known.

In this study, use of flexural strength of RRM and adopting a Reinforced Concrete (RC) Tie-back at the top of the retaining wall to optimize the conventional design was explored. The experimental investigation was carried out to find out the flexural, compressive and shear strength of RRM. Further, bond strength between Reinforced Concrete (RC) and RRM was investigated. These tests results have been used to ascertain the adoptability of suggested optimizations.

From the experimental study, it was concluded that magnitude of material strengths of RRM are sufficient for considerable optimization by taking into account the effect of flexural strength of RRM and adopting a Tie- back. The width of the base of wall section reduction for 3m high retaining wall was 28% as the result of the optimization.

Keywords: Random Rubble Masonry, Retaining walls, Optimization, Tie- back, Flexural Strength.

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LIST OF ABBREVIATIONS

Abbreviation	Description
RRM	Random Rubble Masonry
RC	Reinforced Concrete
BS	British Standard
ICTAD	Institution of Construction Training & Development
HM	Hydraulic Mortar
AM	Air Lime Mortar
ASTM	American Society for Testing and Materials

LIST OF APPENDICES